a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus, wherein one of said sensors in said second sensor array is an infrared sensor;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying an unknown analyte.

REMARKS

Claims 1-11 and 19-25 are pending in the present application. Claims 1, 19 and 23-25 have been amended. The claims as pending are set forth in the Appendix for the Examiner's convenience. Reconsideration is respectfully requested.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

I. BRIEF OVERVIEW OF THE CLAIMED INVENTION

The present invention provides a **distributed sensing system in a networked environment for identifying an analyte**, the system comprising: **a first sensor array** connected to the network comprising sensors **capable of producing a first response in the presence of a chemical stimulus**; **a second sensor array** connected to the network comprising sensors **capable of producing a second response in the presence of a physical stimulus**; and means for **identifying the analyte**. The present invention provides a **distributed sensing system**, because the sensor arrays can be separated and distributed over large spatial areas. Examples of the use of the distributed

sensing system over large spatial areas include monitoring emission levels from industrial plants such as chemical and textile plants; progression of a plume of an escaped gas; and perimeter monitoring on industrial sites *(see also page 8, line 33 to page 9, line 32 of the specification)*.

The present invention provides the sensor arrays in a **networked environment** because, the data (i.e. responses) from the various spatially distributed sensor arrays are brought to a computer for processing to ultimately **identify** an unknown analyte. For example, as recited in the specification, suitable networks include a wireless or wired computer local area network, an intranet or the Internet. For example, see page 12, lines 15-18 of the specification, where Applicants clearly set forth that "the sensors can be separated over larger spatial areas, wherein the sensor arrays are connected via a network, such as a computer local area network, or the Internet." Further, the methods and systems of the present invention are used to **identify an unknown analyte** based on the responses (first response and a second response) provided by the first and second sensor arrays.

The present invention provides **first and second sensor arrays**. The first sensor array being responsive to a chemical stimuli and the second sensor array being responsive to a physical stimuli. Numerous advantages are achieved using the dual sensor array of the present invention over the conventional single array devices or systems. For example, the present system captures additional stimuli that in traditional systems go undetected. This dual sensor array feature allows unparalleled detection and identification of analytes in an environment. By detecting additional stimuli in the environment, a more robust system is realized.

Identifying an unknown analyte as used in the present application means that the identity of an unknown substance is determined. This is more than merely measuring the physical parameters of a known substance. This determination of the identity of an unknown substance, establishes the substance's identity, or names it. In the present invention, this identification includes a comparison of the responses from the first and second sensor arrays with stored or known responses, where as a result of the

comparison the analyte is identified. Various techniques for carrying out the identification include, for example, principal component analysis, Fisher linear analysis, neural networks, pattern recognition as well as other as are set forth beginning on page 21 of the present application.

II. CLAIM OBJECTIONS

Claims 1, 19 and 23-25 have been objected to because of certain informalities, and the Examiner has required appropriate corrections. Applicants have amended claims 1, 19 and 23-25 by replacing the phrase "said unknown analyte" with "an unknown analyte" as suggested by the Examiner.

II. REJECTION UNDER 35 U.S.C. §102(e)

Claims 1-6, 10-11, 19-22 and 24 have been rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,244,096 ("Lewis") to Lewis et al. Applicants respectfully submit that amended independent claims 1, 19 and 24 are not anticipated and are distinguishable over the cited reference (Lewis) for reasons set forth below. Furthermore, considering that dependent claims 2-6 and 10-11 comprise all the features of independent claim 1, from which they depend, these claims are patentable to the same extent that independent claim 1 is patentable. Further, considering that dependent claims 20-22 include all the features of independent claim 19, from which they depend, these claims are patentable to the same extent that independent claim 19 is patentable.

A. The Cited Reference

The Examiner states that with respect to claim 1, 19 and 24 the Lewis reference teaches all the elements of independent claims 1, 19 and 24.

However, the Lewis reference teaches a device for detecting the presence of an analyte, the device comprising: a sample chamber having a fluid inlet port for the influx of the analyte; a fluid concentrator in flow communication with the sample chamber, wherein the fluid concentrator has an absorbent material capable of absorbing

the analyte and capable of desorbing a concentrated analyte; and an array of sensors in fluid communication with the concentrated analyte (see col. 3, lines 13-22 and Abstract).

The primary motivation of the Lewis reference is to increase the sensitivity of a sensing device to trace amounts of analytes by a large factor, and thus allow for the use of existing sensor systems for applications where an increase in sensitivity renders them more effective. To provide this increased sensitivity, Lewis teaches a vapor concentrator in a sample chamber, within which an array (as in one array) is placed (*see col. 4, lines 30-37*).

B. Cited Reference Distinguished

The Lewis reference does not teach or suggest all the prominent features of independent claims 1, 19 and 24. These prominent features include a distributed sensor system in a networked environment; dual sensor arrays having a first sensor array connected to the network and capable of producing a first response in the presence of a chemical stimulus; and a second sensor array connected to the network and capable of producing a second response in the presence of a physical stimulus.

The Lewis reference and specifically the teachings provided in col. 7 lines 8-48 and lines 65-67 (which are cited by the Examiner) are completely silent with regard to these prominent features. With regard to the teachings of col. 7, lines 8-48, Applicants respectfully submit that Lewis describes a plethora of suitable types of sensors that could be employed for the (as in one) sensor array that is placed within the sample chamber. Lewis is completely silent regarding the two sensor array types of the present invention. Lewis is completely silent regarding having two sensor arrays where a first array is responsive to a chemical stimuli and where a second array is responsive to a physical stimuli.

With regard to the teachings of lines 65-67 of col. 7 of Lewis, Applicants respectfully submit that neither this nor any other portion of Lewis teaches a first sensor array and a second sensor array that are connected to a computer network, nor does Lewis teach a distributed sensing system having the dual sensor arrays. Lines 65-67 of col. 7 of

Lewis teach that a "detector or the measuring device is an integrated circuit comprising a neural network based hardware..." Applicants respectfully submit that an integrated circuit, even one comprising a neural network based hardware, is not a computer network, as is known generally and also by those of skill in the art.

For reasons set forth above, Applicants respectfully request that claims 1, 19 and 24 are not anticipated by the Lewis reference. Furthermore, considering that dependent claims 2-6 and 10-11 comprise all the features of independent claim 1, from which they depend, these claims are patentable to the same extent that independent claim 1 is patentable. Further, considering that dependent claims 20-22 include all the features of independent claim 19, from which they depend, these claims are patentable to the same extent that independent claim 19 is patentable. As such, Applicants respectfully request that the Examiner withdraws the 35 USC 102(e) rejection of claims 1-6, 10-11, 19-22 and 24.

III. REJECTION UNDER 35 U.S.C. §103

The Examiner has rejected claims 7-9, 23 and 25 under 35 U.S.C. §103(a) as allegedly being obvious over Lewis in view of U.S. Patent Application Publication 2002/0005580 to Goodman et al. ("Goodman"). The Examiner asserts that Lewis does not teach a first sensor being connected to a network via a wireless connection, but that Goodman teaches a first sensor being connected with the network via a wireless connection.

While applicants may agree with the Examiner that Goodman teaches a wireless connectivity, Applicants respectfully disagree with the Examiner's rejection of claims 7-9, 23 and 25 under 35 U.S.C. §103.

With regard to independent claims 23 and 25, Applicants respectfully submit that at least for reasons set forth above for claims 1, 19 and 24 that claims 23 and 25 are patentable and distinguishable over the Lewis (Primary) reference. Moreover, the secondary reference of Goodman does not supply the deficiencies of the primary reference. The Goodman reference is directed towards techniques for fabricating or

manufacturing sensors to detect analytes in fluids. As such Goodman teaches sensor materials and the manufacturing of an integrated circuit comprising those sensors.

The sensor array (as in one) of Goodman has sensors that are all of the same type; there are no first and second sensor arrays where one is responsive to a chemical stimuli and where the second sensor array is responsive to a physical stimuli, as is in the present invention. Therefore, Applicants respectfully submit that claims 23 and 25 are patentable over Lewis in view of Goodman. As such, Applicants respectfully request that the Examiner withdraws the 35 U.S.C. §103(a) rejection of claims 23 and 25.

With regard to claims 7-9, Applicants respectfully submit while applicants may agree with the Examiner that Goodman teaches a wireless connectivity, Applicants respectfully disagree with the Examiner's rejection of claims 7-9 under 35 U.S.C. §103. Claims 7-9 which depend from independent claim 1, include all the limitations of claim 1. With regard to independent claim 1, Applicants respectfully submit that at least for reasons set forth above for claim1 this claim (claim 1) is patentable and distinguishable over the Lewis (Primary) reference. Moreover, the secondary reference of Goodman does not supply the deficiencies of the primary reference. The sensors of Goodman are all of the same type; there are no first and second sensor arrays where one is responsive to a chemical stimuli and where the second sensor array is responsive to a physical stimuli, as is in the present invention. Therefore, Applicants respectfully submit that claims 7-9 are patentable over Lewis in view of Goodman. As such, Applicants respectfully request that the Examiner withdraws the 35 U.S.C. §103(a) rejection of claims 7-9.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Claims 1, 19and 23-25 have been amended as follows:

1. (Twice Amended) A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus;

a computer connected to said network;

a computer readable algorithm for execution by said computer for identifying said analyte, said computer readable algorithm comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying **[said]** an unknown analyte.

19. (Twice Amended) A method for transferring a combination of chemical and physical data over a computer network for identification of an analyte, said method comprising:

transmitting sensory data from a first sensor array comprising sensors capable of producing a first response in the presence of a chemical stimulus to a remote location;

transmitting physical data from a second sensor array comprising sensors capable of producing a second response in the presence of a physical stimulus to a remote location; and

processing said sensory and physical data at said remote location for identification of an analyte, wherein said processing comprises

comparing said first response and said second response with a known response, and

identifying **[said]** an unknown analyte.

23. (Amended) A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus, wherein said first sensor is connected with said network via a wireless connection;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying **[said]** an unknown analyte.

24. (Amended) A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus, wherein one of said sensors in said second sensor array is an infrared sensor;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying **[said]** an unknown analyte.

25. (Amended) A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus, wherein said first sensor is connected with said network via a wireless connection;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus, wherein one of said sensors in said second sensor array is an infrared sensor;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying **[said]** an unknown analyte.

APPENDIX – PENDING CLAIMS

1. A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus;

a computer connected to said network;

a computer readable algorithm for execution by said computer for identifying said analyte, said computer readable algorithm comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying an unknown analyte.

2. The system according to claim 1, wherein said algorithm selects the most relevant sensor modality in said first and said second array to identify said analyte.

3. The system according to claim 1, wherein each sensor of said first sensor array is a member selected from the group consisting of a bulk conducting polymer film, a semiconducting polymer sensor, a surface acoustic wave device, a fiber optic micromirror, a quartz crystal microbalance, a conducting/nonconducting regions sensor, a dye impregnated polymeric coatings on optical fiber and combinations thereof.

4. The system according to claim 1, wherein each sensor of said second sensor array is a member selected from the group consisting of an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

5. The system according to claim 3, wherein each sensor of said first sensor array is a conducting/nonconducting regions sensor.

6. The system according to claim 4, wherein each sensor of said second sensor array is an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

7. The system according to claim 1, wherein the transmission of said first response is conducted via wired communications.

8. The system according to claim 1, wherein the transmission of said first response is conducted via wireless communications.

9. The system according to claim 8, wherein said wireless communications are implemented using communications technologies selected from a member of a group consisting of infrared technology, satellite technology, microwave technology and radio wave technology.

10. The system according to claim 1, wherein said networked environment is a member selected from the group consisting of a worldwide computer network, an internet, the Internet, a wide area network, a local area network, an intranet and combinations thereof.

11. The system according to claim 1, wherein said networked environment is the Internet.

19. A method for transferring a combination of chemical and physical data over a computer network for identification of an analyte, said method comprising:

transmitting sensory data from a first sensor array comprising sensors capable of producing a first response in the presence of a chemical stimulus to a remote location;

transmitting physical data from a second sensor array comprising sensors capable of producing a second response in the presence of a physical stimulus to a remote location; and

processing said sensory and physical data at said remote location for identification of an analyte, wherein said processing comprises

comparing said first response and said second response with a known response, and

identifying an unknown analyte.

20. The method according to claim 19, further comprising employing a sensor selection algorithm to determine sensors in said first array.

21. The method according to claim 19, wherein each sensor of said first sensor array is a member selected from the group consisting of a bulk conducting polymer film, a semiconducting polymer sensor, a surface acoustic wave device, a fiber optic micromirror, a quartz crystal microbalance, a conducting/nonconducting regions sensor, a dye impregnated polymeric coatings on optical fiber and combinations thereof.

22. The method according to claim 19, wherein each sensor of said second sensor array is a member selected from the group consisting of an optical sensor, a mechanical sensor, a radiation sensor, a thermal sensor and combinations thereof.

23. A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus, wherein said first sensor is connected with said network via a wireless connection;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying an unknown analyte.

24. A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus, wherein one of said sensors in said second sensor array is an infrared sensor;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying an unknown analyte.

25. A distributed sensing system in a networked environment for identifying an analyte, said system comprising:

a first sensor array connected to said network comprising sensors capable of producing a first response in the presence of a chemical stimulus, wherein said first sensor is connected with said network via a wireless connection;

a second sensor array connected to said network comprising sensors capable of producing a second response in the presence of a physical stimulus, wherein one of said sensors in said second sensor array is an infrared sensor;

a computer connected to said network;

computer readable instructions for execution by said computer for identifying said analyte, said computer readable instructions comprising

instructions for comparing said first response and said second response with a known response, and

instructions for identifying an unknown analyte.